

Appl. No.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

CLAIMS

1. (original) A method of controlling the displacements of a moving portion of a multi-axis robot along a path, the method being characterized in that it comprises the steps consisting in:

- providing movement instructions (300) to a path generator (400), the instructions including at least information relating to the shape of the path (320) and to force setpoints (310);
- calculating an external force signal (800) representing at least one component of the force (F) exerted by said moving portion (O) on its environment;
- acting at a predetermined sampling frequency to provide said external force signal (800) to said path generator (400);
- calculating, with said path generator (400) and at a predetermined sampling frequency, movement setpoints (500) along said path (320) in such a manner as to minimize the difference between the projection (FT) of the external force onto the tangent (T) of the path and the projection of the setpoint onto said tangent; and

Appl. No.

· delivering said movement setpoints (500) to a servo-control means (601-606) enabling at least one axis of said robot (600) to be set into movement in compliance with said movement setpoints (500).

2. (original) A method according to claim 1, characterized in that said external force signal (800) is calculated from information representing the current flowing in at least one actuator (601-606) of said robot (600).

3. (currently amended) A method according to ~~either preceding~~ claim 1, characterized in that it includes a step consisting in using a dynamic model (712) of said robot (600) while calculating said external force signal (800).

4. (currently amended) A method according to ~~any preceding~~ claim 1, characterized in that it includes a step consisting in supplying said path generator (400) with at least one velocity limit value (330) and/or at least one acceleration limit value (340) for taking into account while calculating said movement setpoints (500), such that said setpoints comply with said limit value(s).

Appl. No.

5. (original) Apparatus for controlling the displacements of a moving portion of a multi-axis robot along a path, the apparatus being characterized in that it comprises:

- a path generator (400) suitable for calculating movement setpoints (500) as a function of movement instructions (300) including at least information relating to the shape of the path (320) and to its force setpoints (310); and

- a force estimator (700) suitable for generating an external force signal (800) representing at least one component of the force (F) exerted by said moving portion (O) on its environment and for delivering said signal to said path generator at a predetermined sampling frequency, where said path generator is suitable for calculating said movement setpoints (500) along said path (320) at a predetermined sampling frequency in such a manner as to minimize the difference between the projection (FT) of the external force on the tangent (T) to the path and the projection of the force setpoint onto said tangent, said movement setpoints (500) being delivered to a servo-control means (601-606) enabling at least one axis of said robot (600) to be set into movement.

6. (original) Apparatus according to claim 5, characterized in that it comprises program interpreter means (200) suitable for

Appl. No.

executing programs containing movement instructions (300)

enabling at least the shape of the path (320) and force setpoints (310) to be specified.